



Analysis of Acidulants in White Wine using HPLC

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Food

Abstract

Sorbic acid and citric acids are commonly used as acidulants¹ and/or as preservatives. Acetic, propionic, succinic, adipic, lactic, fumaric, malic, tartaric, and phosphoric acids can serve as acidulants as well. Acidulants are used for various purposes in modern food processing. For example, citric acid adds a fresh, acidic flavor, whereas succinic acid gives food a more salty, bitter taste. In addition to rendering foods more palatable and stimulating, acidulants act as

- flavoring agents to intensify certain tastes and mask undesirable aftertastes
- buffering agents to control the pH during food processing and of the finished products
- preservatives to prevent growth of microorganisms
- synergists to antioxidants to prevent rancidity and browning
- viscosity modifiers in baked goods
- melting modifiers in cheese spreads and hard candy
- meat curing agents to enhance color and flavor

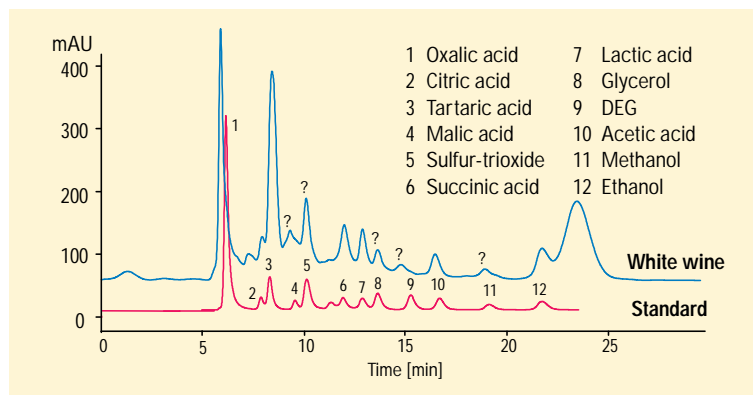


Figure 1
Analysis of acidulants in white wine

Conditions

Column

300 ~ 7.8 mm BioRad HPX 87-H, 9 µm

Mobile phase

0.0035M H₂SO₄ isocratic

Flow rate 0.6 ml/min

Column compartment 65 °C

Injection vol 10 µl

Detector

UV-VWD detection wavelength
192 nm or 210 nm

Sample preparation

Filtration



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Sample preparation

Sample preparation depends strongly on the matrix to be analyzed, but in general steam distillation and solid-phase extraction techniques can be used.

Chromatographic conditions

High-performance liquid chromatography (HPLC) with UV-visible diode-array detection (UV-DAD) has been applied in the analysis of citric acid in wine and in a vodka mixed drink. Retention time and spectral data were used as identification tools.

HPLC method performance

Limit of detection

100ng injected amount,
S/N = 2 equivalent to 2 ppm
with 50 µl injected volume

Repeatability of

RT over 10 runs <0.1%
areas over 10 runs <3 %

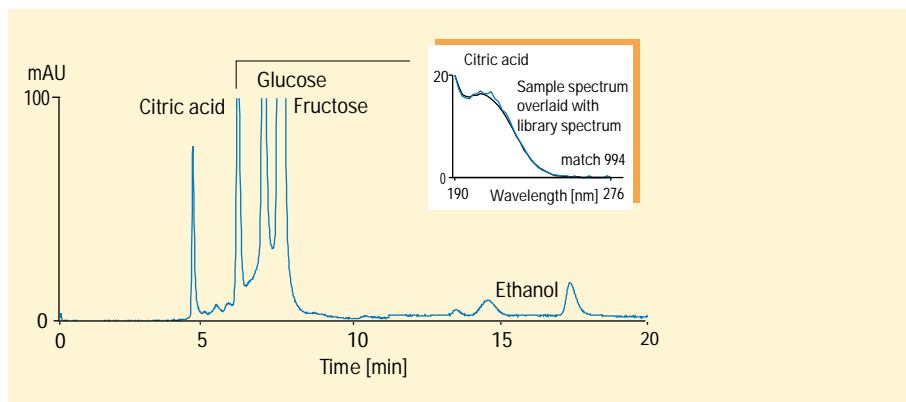


Figure 2
Analysis of citric acid in vodka

References

1.

Official Methods of Analysis, Food Compositions; Additives, Natural Contaminants, 15th ed; AOAC: Arlington, VA, 1990, Vol. 2.; Official Method AOAC 986.13: quinic, malic, citric acid in cranberry juice cocktail and apple juice.

Conditions

Sample preparation filtration
Column

300 × 7.8 mm BioRad HPX 87-H,
9 µm

Mobile phase

0.007M H₂SO₄ isocratic

Flow rate

0.6 ml/min

Column compartment

65 °C

Injection vol

10 µl

Detector

UV-DAD

Equipment

Agilent 1100 Series

- degasser
 - isocratic pump
 - autosampler
 - thermostatted column compartment
 - diode array detector, variable wavelength detector or refractive index
- Agilent ChemStation + software

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